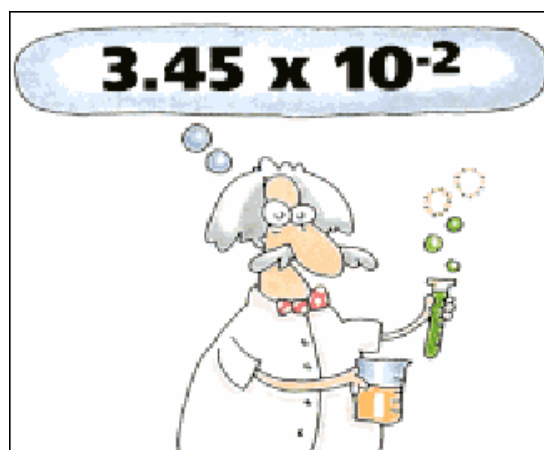


Converting Scientific Notation



SCIENTIFIC NOTATION

Scientific notation is a way of writing very large or very small numbers that are hard to express in decimal form

A number is written in **scientific notation** if it is of the form

$$c \times 10^n$$

where C is between 1 and 10 and n is an integer.

1.000... and 9.9999...

- * an integer is a positive, negative whole number including zero
{... -3, -2, -1, 0, 1, 2, 3 ... }

TIMESTENTOTHE

"2nd" "Comma" → EE

$$E = \times 10^{\quad}$$

$$2E5 = 2 \times 10^5$$

$$cEn = c \times 10^n$$

Which of the following are written in proper scientific notation? Trash the rest...

$$2.35 \times 10^5$$

$$2.1203 \times 10^{-16}$$

$$5 \times 10^{-9}$$

$$3.214 \times 10^1$$

$$6.09 \times 10^7$$

$$1.9 \times 10^{-22}$$



NOT written in proper scientific notation

Scientific notation is used to write really big numbers. These values are greater than one.

decimal notation ●————→ *scientific notation*

123,000,000,000★

1.23 x 10¹¹
1.23E11

45,000,000★

4.5 x 10⁷
4.5E7


67,800,000,000,000★

6.78 x 10¹³
6.78E13

move the star to count the number of decimal places

the amount of moves will give you the exponent value

Scientific notation is used to write really big numbers. These values are all greater than one.

scientific notation  *decimal notation*

$$7.82 \times 10^3$$

7,820

$$3.04 \times 10^8$$

304,000,000

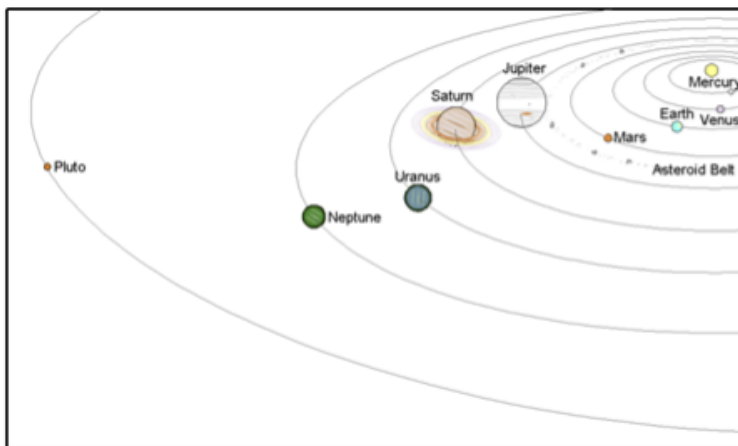
$$5 \times 10^4$$

50,000

the exponent tells you
how many decimal
places you need to move

*An example of a really big number.
Please write it in scientific notation.*

As the planets orbit the sun, the closest Pluto gets to Earth is approximately 2,700,000,000 miles. ★



2.7×10^9 miles

*An example of a really big number.
Please write it in scientific notation.*

The speed of light in a vacuum is approximately
 1.86×10^5 miles per second.



186,000 miles/second

Scientific notation is used to write really small numbers. These values are all less than one.

decimal notation ●————→ *scientific notation*

0.000000034
★

3.4×10^{-8}

0.0000000005609
★

5.609×10^{-10}

0.0000000000064
★

6.4×10^{-11}

move the star to count the
number of decimal places

the amount of moves will
give you the exponent
value

Scientific notation is used to write really small numbers, any values less than one.

scientific notation ●————→ *decimal notation*

4.8×10^{-6}

0.0000048

1.2×10^{-2}

0.012

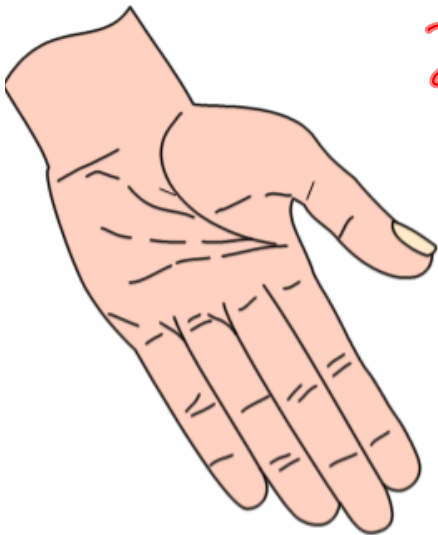
9×10^{-8}

0.00000009

the exponent tells you
how many decimal
places you need to move

*An example of a really small number.
Please write it in scientific notation.*

Human fingernails grow at a rate of about 0.00286 inches per day.

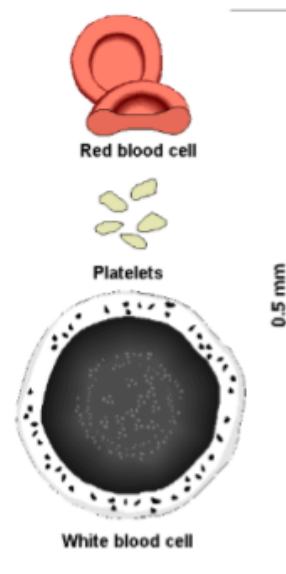


$2.86 \text{ E}-3$

*An example of a really small number.
Please write it in scientific notation.*

The thickness of a red blood cell is approximately 3.125×10^{-4} of an inch. Convert to standard notation.

0.0003125 inches



When do you write a **negative** exponent when converting to scientific notation?

When the number is a decimal

When do you write a **positive** exponent when converting to scientific notation?

When the number is 1 or greater

Extra Practice

Rewrite in decimal form.

1. 3.79×10^5

379000

2. 2.5×10^{-2}

0.025

3. 8.44×10^1

84.4

4. 6.5393×10^4

65393

5. 3.589×10^{-3}

0.003589

6. 9.1187×10^0

9.1187

7. 1.0056×10^{-5}

0.000010056

8. 7.2658746×10^8

726587460

Extra Practice

Rewrite in scientific notation.

7,960,000,000

$7.96E9$

0.007485

$7.485E-3$

45.668

$4.5668E1$

998.653

$9.98653E2$

0.0000056388

$5.6388E-6$

63,000,000

$6.3E7$

0.0602

$6.02E-2$

22,078,600

$2.20786E7$

64.3

$6.43E1$